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The EXTENSION ANIMAL HUSBANDMAN

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THE EXTENSION ANIMAL HUSBANDMAN

Issued quarterly by the Bureau of Animal Industry
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C. D. Lowe, Senior Extension Animal Husbandman,
K. F. Warner, Senior Extension Meat Specialist.

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THE WESTERN SHEEP BREEDING LABORATORY AND U. S. SHEEP EXPERIMENT STATION

By Julius E. Nordby, Director,
Dubois, Idaho.

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The Western Sheep Breeding Laboratory was established in 1937 and was located at Dubois, Idaho, in conjunction with the United States Sheep Experiment Station where sheep breeding had been under way by the Bureau of Animal Industry since 1917. By the establishment of the Regional Sheep Breeding Laboratory at the location of the U. S. Sheep Experiment Station its grazing facilities, equipment, and sheep were made available for the Regional Laboratory. The facilities comprised approximately 28,000 acres of spring-fall range, 20,000 acres of summer range, and Forest Reserve allotments for winter and some summer grazing. The physical plant at headquarters was equipped with lambing facilities for about 1,000 ewes at a time, and shearing facilities and dwellings for the personnel. More than 3,000 sheep of the Rambouillet, Columbia, Targhee, and Corriedale breeds were also on hand.

The average elevation of the various range areas is approximately 6,500 feet. Headquarters are located on the spring-fall range at an elevation of 5,500 feet, in the northeastern part of Idaho, about 90 miles west of the Yellowstone Park and 25 miles south of the Montana boundary. The spring-fall range is a typical sagebrush type providing normally a fairly desirable cover of typical upland sagebrush range grass types and browse.

Since the Regional Laboratory was located here, a number of dwellings have been constructed for additional personnel. An experimental laboratory barn has been built, and also a central laboratory building which provides office space and laboratory facilities for research in scouring and cross-sectioning wool, as well as for research in the physiology of reproduction and artificial insemination. The Laboratory is located at headquarters 8-1/2 miles from Dubois, Idaho, and on the spring-fall range area where the research personnel is within accessible distance of the research flocks on any of the seasonal ranges, and while the flocks are in winter quarters.

The flocks are maintained under strictly ranch conditions, on high altitude ranges in the summer from which they return when fall storms begin to threaten, or the frost has too greatly injured the feed. They are usually on the winter range until storms become too severe, which occur generally in January. The remainder of the winter is spent on alfalfa hay in an irrigated valley about 40 miles

from headquarters. The sheep are in the open the year around. Since the improvement sought is based strictly on utility qualities, it is quite important that the management be essentially of the type that is typical for desirable sheep ranching management.

A total of 92 separate pen matings were made in the fall of 1939 involving all the breeds previously mentioned. Approximately 150 stud rams are maintained, although not more than about 100 are used each year in the research and test flocks. When new breeds and new lines are under development it is very necessary to maintain a number of reserve stud rams.

Objectives

The main objective of the program is the improvement of sheep through breeding. The improvement is measured by the application of utility standards as they concern commercial production under ranching conditions. Production is measured on the basis of wool yield, and in pounds of lamb of the desirable type and finish. Obviously, the staple length and the quality and uniformity of fibers, as well as the shrinkage, are important factors that are studied with the yield of wool. All useful type characteristics that influence lamb production, ranch adaptability, and general serviceability are closely integrated in the improvement program. Under ranching conditions at relatively high altitudes, where winter storms are frequently severe, the objectives in sheep improvement must also include a consideration of those characteristics in a fleece that protect the sheep against weather extremes. The fleece must be relatively long and "lofty" as well as dense and must hold together along the topline and cover well the underline.

Selection

Every effort is being made to measure the efficiency of the available means of selecting both young and mature sheep, and to develop new rapid methods that may have useful application when applied to large numbers of sheep. Recognition must be taken of the dual usefulness of sheep, as well as of the situation that the dual uses are not necessarily equal in importance. In general, meat production is emphasized above wool production in ranch sheep. It is also more difficult to make selections for meat-production efficiency than for wool production efficiency because the measures of wool production performance are more available and apparently more reliable than they are for meat-production performance. Moreover, the lifetime annual yield and quality of wool can be fairly accurately predicted when the sheep is a yearling, if the yearling fleece weight is reduced to a twelve-month basis. The lifetime efficiency for meat production cannot be measured so effectively at this time.

Besides we are interested in the mature form of mutton sheep on the basis of its value for producing the right kind of market and feeder lambs, and replacement ewes. While obviously the mature size, form, and fleshing quality of a sheep are important, the ranchman is perhaps fully as concerned with weight, form, and fleshing qualities at the time of weaning the lamb, because it is at this time that weight and form, but principally fleshing, will determine if the lamb is a market lamb or a feeder lamb. The milking quality in ewes is observed just after lambing, and this is further checked in their ability to produce vigorous and fleshy lambs. In the selection program, therefore, much emphasis is placed upon the finish in lambs at the time of weaning. Due consideration is given to twins in this connection. Stud ram prospects are scored carefully for market qualities at weaning, because a ram lamb that has the acceptable growth, ruggedness, form and finish at weaning time is probably more apt to be a potential sire of lambs of the same kind, than is a more slowly maturing ram that does not develop these qualities before he is more mature. Vigor is an essential quality in the selection of ranch sheep. Some ewes, and rams also, "wear" uniformly well under heavy service until they are seven or even eight years of age. Others begin to decline early in life and are on the "cull" list at five or before.

"Wool-blind" lambs are a constant annoyance on the range. They are usually trailing the band and getting the trampled feed, or are straying from the band, falling into water holes, or staying entirely away from them. They are usually with the thin end of the "cut" at weaning time and are then headed for the feed lot where their continued timidness and inability to see make them only second rate feeders. Ewes with open faces at this station yield slightly heavier fleeces, both scoured and unscoured, than ewes that are wool blind, and wool-blind ewes have no important advantage over open faced ewes.

Heavy folds in Rambouillets are of little if any value in range production. The smooth-bodied Rambouillets at this station shear approximately the same as those with heavy neck folds and their fleece is longer and freer from grease and dirt. Selection is, therefore, toward the smooth Rambouillet with increased length of staple and lighter-shrinking, brighter fleeces.

Procedure

In an effort to undertake fundamental improvement in Rambouillet sheep there is now under way the development of 34 potential inbred lines involving some over 800 ewes. There are also in use about 700 Rambouillet ewes for testing rams. Rams are tested before they are placed in service in the inbred lines. Their merits are analyzed on the basis of their progeny as well as on their own individual merits for growth, form, and wool production. The same approach is made in the development of the Columbia, Targhee, and Corriedale breeds.

It appears difficult to pursue a definitely prescribed rate for intensifying the degree of inbreeding. Since the breeding program is designed for the improvement of sheep, and not for the sake of inbreeding, it seems more suitable to proceed from generation to generation with judgment that is based on the best performance record available. Even though in general all of the 34 potential lines have a common origin in the flock of this Laboratory, - except for a few in which rams have been used from outside flocks, it is not to be expected that very many of these lines will respond equally to the same intensity of inbreeding. Indeed, the rate of inbreeding to which each line is subjected is based upon individual merit and performance within each line rather than upon the anticipated outcome based upon the relationship of one line to another line in which progress may be measurably in evidence. While, in general, the object is to intensify the inbreeding as rapidly as possible, it is desirable as the program progresses to test rams in each inbred series from time to time for their usefulness when mated to outcross purebred or commercial ewes. This will serve as a check upon the progress due to inbreeding. No doubt, it will be found that some lines will reach their maximum usefulness with a smaller amount of inbreeding than other lines, and if inbreeding proceeds much beyond this optimum level it may become necessary to salvage the line by introducing into it a ram from another line for the production of a hybrid line.

In the development of these lines it is expected that there will occur some heritable differences within the various lines. One line may become relatively uniform for the production of long staple, another for "open face", another for excellent mutton form, etc. When this occurs,--and progress is now made in that direction--any other line can be improved by converging into it through a ram, for instance, any one of the characters desired such as long staple, etc. This will bring inheritance more under control than is possible in flocks with relatively mixed ancestry even though the individuality in these flocks is considerably above the average.

Inbred lines will be crossed for the production of hybrid lines. This should prove useful even though there are no outstanding differences such as long staple, etc. It is reasonable to expect that no two lines that have been bred apart for some time will have precisely the same dominant genes that determine the development of characteristics even though the form and function of the two lines are apparently the same. By crossing two such lines there will occur a new combination of dominant factors for useful characters, different in kind, occupying different loci on the chromosome and likely larger in total number. There may be bther reasons for increased metabolic activity in the hybrid. However, the producer of sheep is more interested in the result than in the cause.

The best inheritance in Rambouillets does not all occur in one flock. An effort is being made to test rams from a number of

stud flocks, from time to time, with a view of finding rams that possess qualities that may not be so highly developed in the Laboratory flock. When these introductions prove desirable, the rams serve as the basis for a new inbred line so the qualities in question can be concentrated, or, to put it another way, that the line can be purified for these qualities. Moreover, inasmuch as the 11 western States and Texas are collaborating in this Laboratory program through their experiment stations, a number of the State stations are now undertaking inbreeding in their Rambouillet flocks with a view of testing the homozygosity of their flocks for good qualities and then to intensify this purity still further, thus making possible a more complete test of representative flocks in the West and affording a much broader opportunity for the crossing of desirable lines than would be possible if these studies were limited to the Laboratory flock.

Inasmuch as the inbreeding program in its present form has been in operation for only three years, there are no specific results ascribed to inbreeding up to this time. The differences in the characteristics that obtain in the lines so far are due primarily to the original selection. For instance, one group of ewes was selected especially for length of staple, another for the open-face character, etc. In addition to these qualities they must obviously qualify in other useful characteristics. When these characteristics are reasonably well fixed in these lines, no doubt, rams from these lines will be used generously in correcting deficiencies in these characteristics in other lines. It is difficult at this stage of the program to visualize any one line as definitely closed from the influence from any other line. The program is designed for sheep improvement, and, since not all of the best qualities can possibly be found in any one line, (or if it were, it would likely not stay that way very long in competition with a constructive purifying and converging program involving many lines) it is quite probable that an effort will be made to combine as large a number as possible of the good qualities of many lines into synthetic hybrids.

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RANGE SHEEP IMPROVEMENT

Tony Fellhauer, Wyoming extension livestock specialist has prepared a mimeograph on the above subject which discusses methods and includes some result data, which will be of interest to those working in this field. In connection with this activity Mr. Fellhauer uses a short "movie" of Dean Hill engaged in culling ewes by the "touch" system.

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LIVESTOCK IN ALASKA

By I. M. C. Anderson, Animal Husbandman,
Alaska Experiment Station and Extension Service.

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Our livestock projects in Alaska are dairy cattle, sheep and hogs. I believe there is an opportunity to do some work with beef cattle on some of the islands to the southwest. Our beef cattle are located on Kodiak and adjacent islands and run on the range the year round. The winter feed is mostly along the coast. The cattle winter on beach rye which grows just above high tide and the kelp which is washed in during high tide. They seem to get by the winter in pretty good shape provided they are not caught by the tide or killed by the Kodiak bear. Very little supplemental feeding is done; however, I believe that a little cottonseed cake could be profitably fed during the late winter. There is plenty of range available during the summer months. The carrying capacity on an annual basis is governed by the amount of beach rye available for winter feed.

As yet I have not visited Chirikof Island where approximately a thousand head of cattle have developed, without the assistance of man, from a herd of five or six cows and a bull placed there sometime in the late 1880's. These cattle run wild and are killed the same as wild game, and some of them used for beef by the whaling vessels. The man who now claims ownership of these cattle by virtue of the fact that he owns the lease on the Island, killed 270 bulls in one summer. He states that these cattle have distributed themselves to various sections of the Island and that they have developed characteristics based on differences in environmental conditions.

Several attempts have been made to slaughter these cattle for delivery to some of the other islands but so far with very little success. The coast of the Island is surrounded by shallow water which makes the landing of large boats impossible, and small boats can be operated only in absolute calm. There are, of course, no cold storage facilities on the Island.

Last summer when I was on Kodiak Island I saw some cattle that were supposed to be descended from old Russian stock. They were brown in color with some white markings. The general conformation was similar to that of the Shorthorn but they were a little shorter of leg than one would expect from cattle that had probably had a cross of Holstein or Jersey. They were well covered over the loin and the hindquarters were well developed. Except in color they were fair-looking beef animals.

The interior of Alaska has some possibilities for sheep and cattle production on a small scale. The range seems to be better adapted to sheep than cattle. The handicap of having to store winter feed in a silo makes production costs high. The continual cold weather makes housing important, although I think this point has been over stressed in most sections.

Our dry dairy stock at Matanuska has access to an open shed which the animals use during storms. They seem to be content to sleep in the open except during severe winter storms. The sheep at the Matanuska Station have wintered in the open the last two seasons, but they have an old hay shed that acts as a windbreak and affords a dry place in which to lie down.

The livestock industry in Alaska is moving forward slowly but I believe on a constructive basis. More than half of our total cattle population consists of dairy cows. About half of these are Guernseys in the Matanuska Valley. The commercial dairymen of the territory use mixed herds of Guernseys and Holsteins, but the trend seems to be toward Guernseys.

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PERSONNEL NOTES

Alabama

R. S. Sugg, for many years extension animal husbandman in the Alabama Extension Service, resigned on June 30 to become dean of the veterinary college of the Alabama Polytechnic Insititute at Auburn. Dr. Sugg was succeeded by W. H. Gregory, former assistant agronomy specialist on the same staff.

North Carolina

H. W. Taylor, former extension swine specialist, has been made extension marketing specialist. Mr. Taylor was succeeded by E. V. Vestal who formerly was his assistant.

North Dakota

James D. Gannaway, extension animal husbandman, resigned on August 15 to accept a position with Wilson & Co. at Albert Lea, Minn. Mr. Gannaway was succeeded by Harry B. McLachlin who has been county agricultural agent in Adams County, N. Dak.

Utah

Harry H. Smith is now devoting about three-fourths time to extension work, with major emphasis on beef cattle, swine, meats, and horses. A. C. Esplin devotes about two-thirds time as extension sheep specialist.

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Goodwill is the disposition of a satisfied customer to return to a place where he has been well treated. --From Ruling 81 of the United States Supreme Court.

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WISCONSIN SWINE GROWERS ASK ADVICE

By James J. Lacey, Extension Animal Husbandman,
University of Wisconsin.

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It would be reasonable to believe that miserably low prices for hogs would prompt men to forget good practices in production of the former "mortgage lifters" of the Middle West. It would also be reasonable to believe that lack of interest in hogs selling at 4 cents to a nickel per pound would eliminate all requests for help from animal husbandry specialists in a good hog State. But, reasonable though such beliefs would be, the facts show a different situation in Wisconsin hog counties.

With a beginning that dates back to midsummer, 1939, when Barron County included in its planning program a greater development of hog production, demands from Wisconsin counties have increased throughout late 1939 and 1940 until full time extension could be devoted to swine problems. With a sheep industry that is now on firmer footing, in good practices, more time may be given to swine for the next two or three years, and with results that have been outstanding in sheep program development as a guide, the swine production business should be easy to outline and easy to feature in livestock work.

Boar Sales Established

That a good purebred boar is even more valuable than any other single factor in good market hog production, six purebred boar sales were arranged in October, 1939. These sales came at the request of hog producers throughout the State, and at the six sales, 150 boars were sold at public auction. At each sale a feature of the day's activities was a discussion on type, breed characteristics, cross breeding, and general production problems. The educational work was really primary, the transfer of boars was secondary. Sufficient time was taken to explain the part that extension was taking in the sales plan, one of education coupled with service in locating suitable foundation stock. A continuation of the sales has been provided in the 1940 program.

Parasites Cause Alarm

Roundworms, thorny headed worms, "necro", and mange have become of acute concern to hog raisers in the principal producing areas. Sanitation plans are still the long-time means of control of these disturbing parasites and disorders, but in many cases the sanitary precautions do only a partial job of prevention. This is especially true on

farms where rotation of hog lots and pastures is not possible. In such cases, a worm expeller and a dipping for mange control are used to supplement the sanitation plan.

In Green County in May, County Agent Pavlak recognized the need for attention to swine troubles. A large number of reports of runty pigs indicated to Pavlak that something should be done. A meeting and advertised demonstration on dipping for mange control attracted 30 producers.

The demonstration on mange control was overshadowed by a post mortem that showed excessive roundworm infestation. To expel the roundworms, oil of chenopodium and castor oil were recommended, a second one in another part of the county showed similar infestation, and subsequently more than 400 spring pigs were dipped for mange and treated for worms in this one area. Other counties have followed the Green County plan, and if time would have permitted, the months of May and June could have been devoted to swine-parasite control.

Self-Feeding Shows Favor

An attempt to hit the early fall market with the current pig crop has brought extensive use of self-feeding practice. Trials conducted at the Wisconsin station have shown distinct advantages in this type of production. Hog growers throughout the State are adopting the self-feeder as a piece of standard equipment. The Wisconsin self-feeder, designed by Dr. G. Bohstedt, of the experiment station, has found rapid acceptance because it is home-made, convenient, and inexpensive, and testimony of demands from producers is borne out by the inability to supply bulletins which give instructions and specifications for building. Requests for information on pastures and pasture values have also been unusually numerous.

Hogs Provide Diversification

Wisconsin counties that have previously disregarded hogs as a diversification factor, have, in the last few seasons, given serious consideration to increased numbers. The development of hybrid corn that will mature in northern counties has resulted in a larger feed supply. More advantageous use of dairy by-products has also contributed to more widespread production. Low prices for fluid milk in 1939 caused many dairymen to divert milk into channels that would leave the by-products at home, and even in periods of low prices, hogs are a safe bet to return additional income on dairy farms.

An active feeder-pig business with out-of-State buyers has brought extra dollars to counties where hogs at finished weights would not be profitable. Sale days have been established at numerous centers where pigs may be raised profitably to weaning age, and truck buyers are always the best customers for these light-weight

porkers. Ordinarily the active demand for these feeders is due to the relatively low percentage of parasite infestation that exists in the counties where only few pigs are produced. In one county trucks from five or six adjoining States are regular attendants on sale days.

Requests for assistance in the feeder-pig areas are also extensive. Parasities are less of a problem, but feed and care of the sow and litter are important, and meetings in fall and winter months are already being scheduled. Two litters per year is the general plan on feeder-pig farms, with four litters as the average production per sow.

From all appearances the hog business in this State is looking up, even though prices are low. Maybe that's the reason. Low prices may be forcing attention to lesser costs. At any rate, the interest in better production is there.

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WAR ALREADY CHANGING LIVESTOCK BREEDS

What will the future be as regards the particular breeds of livestock in Denmark, Holland and Belgium, countries now under the control of German forces? It takes a century to develop a great breed of livestock, yet under modern war conditions the work of a century may be obliterated within a few days' time. Denmark has given the world two great breeds -- the Red Danish cow and the Landrace hog. Holland's pride is the Friesian, and Belgium, the Belgian drafter. The destruction of these breeds would be a major loss to the livestock husbandry of the world. Reports already indicate that changes are in prospect as far as the Landrace breed of hogs is concerned. Bred for centuries for bacon purposes, Germany is already changing the breeding program to meet its immediate needs, that of meat and lard, and as a result a great breed may pass out of the livestock picture, at least for many years to come.

(New England Homestead, June 1940)

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AMERICAN SOCIETY OF ANIMAL PRODUCTION

The 33rd annual meeting of the American Society of Animal Production is scheduled to be held at the Sherman Hotel in Chicago, Ill., November 29-30, 1940, which coincides with the opening date of the International Live Stock Exposition. As usual, a special section for the discussion of extension animal husbandry matters will be included, and the committee in charge will have an excellent program to present. All extension livestock specialists should arrange to be in attendance.

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SHEEP EXTENSION WORK IN NORTH DAKOTA

By J. D. Gannaway, Extension Animal Husbandman,
North Dakota State College.

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Parasite Control -

In an effort to control sheep parasites, a system of county organization has been used in North Dakota which deals with the masses rather than with a few individuals who are considerate and interested enough to attend demonstrations.

When North Dakota was still in the romper stage of the sheep business, many other States were wearing grey beards. However, sheep numbers have increased tremendously over short periods of time, and the sheep population has shifted from the western to eastern part of the State following drought periods. With the return of ample feed supplies, the West restocks until shortage of feed again forces them to move eastward. In keeping with such drastic changes, educational work in sheep husbandry has had to move with unprecedented speed, and in many areas the rate of speed wasn't sufficient. Parasites of sheep have taken their toll, particularly those of an internal nature. Drenching and dipping demonstrations have been held in the State for years. However, many wormy lambs continued to arrive at marketing points and "ticky" sheep were the rule rather than the exception.

In 1938 a 2-wheel portable dipping vat, constructed by the Agricultural Engineering Department of the College under the guidance of the extension animal husbandman, was tried out in Sargent County. All the sheep owners in Sargent County were encouraged to dip and the work was organized and carried on under the guidance of S. M. Thorfinnson, county extension agent of Sargent County. Approximately 12,000 head of sheep were dipped and drenched and the program was considered very successful.

In the spring of 1939, the Barnes County sheepmen organized a county dipping and drenching association under the guidance of the county agent and the extension agricultural engineer. The Barnes County sheepmen agreed to advance one cent for each head of sheep they owned to be used towards construction of a dipping vat. They elected a committee, consisting of six members, to be in charge of the program. The committee in turn, with the assistance of the county extension agent and his assistant, hired men, purchased equipment, and supervised the construction of the dipping vat. Of the two men hired, one was placed in charge of the dipping, and the other in charge of drenching. It was made plain right from the beginning that

the labor outside of these two men would have to be furnished by the owner of the sheep. Therefore, the plan was adopted of neighbors exchanging help in a fashion similar to a threshing crew. In this manner, five or six neighbors pooled their efforts, exchanged help, and the dipping vat was run by a full crew at all times. The committee placed a charge of 5 cents per head for dipping and 2 cents per head for drenching on both ewes and lambs. A week's dipping schedule was sent out stating where the vat would be at 7 A.M. and 1 P.M. each day and also listing the sheepmen who were to be there to assist with the work.

While the vat was in the process of completion, questionnaires were mailed to all county sheepmen informing them of the dipping program, asking them to advance one cent per head and other questions which would determine the number of head they would want to dip and drench, the exact location of their farm and whether or not they had sheared. This information was all plotted on a map so that a route requiring the least amount of travel and back-haul could be determined for the dipping vat. There were 9,965 head of sheep dipped and 7,035 head drenched in approximately a month in Barnes County. The charge per head was sufficient to pay for all equipment, the wages of the two men, and a sum of $93.00 remained to the good.

In 1940 fourteen counties have started associations similar to the one found so popular in Barnes County. In these 14 counties a total of 126,393 head of sheep have been dipped this year and 38,437 head were drenched. The average charge per head for the dipping was 4 1/2 cents and 2 cents for drenching.

Including the above-mentioned 14 counties, 28 of the 53 counties in North Dakota have received assistance from the county extension agents in sheep dipping work of some kind. In these 28 counties, a total of 204,203 head of sheep were dipped, and 75,354 have been drenched. The death loss resulting from the dipping and drenching was 15 head as reported to county agents. According to estimated figures, a total of 31 dipping vats were operated in the State during the 1940 dipping season. From a standpoint of actually dipping and drenching sheep on a large scale basis, the county association plan has proved very successful in North Dakota. Of course, demonstrations still have their place. They are used in getting interest started in a given county as sheep dipping has been quite new to many of our inexperienced sheep raisers. For this purpose, a 4-wheel dipping vat with dipping tank and drain platform all attached, was constructed by the Extension Service in 1939 and was hauled over most of the State in both 1939 and 1940 for demonstrational purposes. Besides this 4-wheel vat, a model of the vat was constructed that could be carried in the car and this was exhibited whenever and wherever possible and is given considerable credit for stimulating interest in dipping.

The job isn't done here in North Dakota, but it is well begun. Many of our older sheep States can show records of dipping and drenching that will undoubtedly put ours to shame. It can be truthfully said that North Dakota sheepmen look upon the sheep tick as a mighty unpopular parasite and internal worms are justifiably considered one of the greatest menances to the North Dakota sheep industry. No, the job isn't done, nor probably will it ever be entirely finished, but the work is being carried on with the satisfaction of knowing that we are getting somewhere.

Ram Sales -

For the second successive year the North Dakota Extension Service is planning a large-scale series of purebred ram sales. Last year 51 sales were held in 36 counties. Two trucks were hired and a separate sale route was plotted for each truck. Only registered rams or those eligible for registration were accepted in these sales. Rams were either picked up at the sale points by the trucks or sold to the ram trucks by the individual breeders. The man in charge of each truck reserved the right to accept or refuse rams depending on their quality, price, age, etc.

A total of 469 rams were sold in the 1939 sales series, of which 227 were actually moved from one sale point to another. A charge of $2.25 per head was levied against all rams sold. This paid for the trucks, men, feed, advertising and incidental costs. On a percentage basis, the selling costs were 8.6 percent.

The State breeders welcome this system of selling rams as it helps the large and small breeder alike. It moves rams from areas of over-supply into areas where there is a shortage of rams. North Dakota purebred breeders have found, as have breeders from other States, that a neighbor is usually a poor customer from a financial standpoint. Hence, moving rams into another area usually brings higher prices.

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4-H LAMB FEEDING SUMMARY

A summary of the Minnesota 4-H Lamb Feeding Project for 1939-40 containing information of general interest has been prepared in mimeographed form. Copies may be obtained from W. E. Morris, Extension Service, University Farm, St. Paul, Minn.

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CORRECTION, PLEASE

On page 7 of the last issue of this publication two errors crept in. The words "per pig" in lines 7 and 11 should have been omitted. The author of the article, Frank G. Sutherland of Hawaii was not responsible for the error. Please correct your copy accordingly. --C.D.L.

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GOAT RANGE STUDIES IN ARIZONA

By J. T. Rigden, Extension Animal Husbandman,
University of Arizona.

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Mohair production is rather a new industry in Arizona as compared to other types of agriculture. The records show that some Angora goats were raised in this State as far back as 50 years ago. In the last 25 years the number has increased until Arizona now ranks third in mohair production and numbers of goats in the United States. In this article the term goat refers to the mohair-producing animal and not the milk type. Texas is, of course, the largest mohair-producing State with a large gap to the second place State which is New Mexico, and Arizona follows in third place close behind New Mexico. In the year 1938 the annual income from mohair in Arizona was $221,000. This figure was increased in 1939 to slightly over $300,000. These figures will give some idea of the importance of the industry in this State.

Goats are found here principally in Yavapai, Graham, and Mohave counties with the center of the goat population located in central Yavapai County. The ranges these animals use are more or less rough and broken with browse-type forage plants forming the predominant vegetation. The principal browse species for goats are scrub oak (Quercus turbinella), buck brush (Ceanothus greggii), mountain mahogany (Cercocarpus spp.), buck wheat brush (Eriogonum wrightii), Mimosa buincifera and skunk brush (Rhus trilobata). There are many other species found that are of minor importance or unpalatable to livestock. Some grass is found on these ranges consisting of several types of grama grass, Bouteloua species, Sporobolus species, curly mesquite (Hilaria belangeri) and many annuals. On most of the ranges the composition will run from 75-95 percent browse, the balance grass species, with the total density varying from 0.20 to 0.60. Much of the soils on these various ranges are of the decomposed granite type and are erosive in nature.

In recent years with the increased control on both private and Government lands all types of range users in the State and especially goat men have become interested in the manner and methods of determining carrying capacities on their respective ranges. With this thought in mind the Arizona Mohair Growers' Association in the fall of 1938 contacted the University Extension Service and asked that help be obtained from the Southwestern Forest and Range Experiment Station and the Soil Conservation Service and arrangements made for studies and investigations on carrying capacity and proper usage of the so-called goat ranges in the State. This matter was taken up

by the Extension Service with the other two agencies mentioned and they gave great assistance in getting the studies started.

The main objectives as outlined by the mohair growers were as follows:

1. Under what conditions and to what degree do goats injure range vegetation.
2. A satisfactory method of range surveys on goat lands.
3. The practicability of dual cattle and goat use.
4. The relative grazing capacity of different types of ranges under cattle and goat use.

With these general objectives in mind the representatives of the three services contacted several goat men in Yavapai County and arranged for the following experiment: Two ranches were selected which contained representative range types found in the general area. These ranges were surveyed according to the standard inter-agency survey methods and the resultant figures on carrying capacity were used as a base. Present stocking rates and records of past use were obtained. These figures were used in checking the general over-all condition of the range and the forage growth on it. A general utilization survey was made on the two ranches so a check can be made each year or season of the relative condition of the ranges as a whole and of the various individual forage species found on the range.

Three representative areas were located on each ranch and a fenced enclosure 100 feet square was put in on each one of these locations. Inside of these enclosures line transects were established 100 feet in length to measure the density of the grass species occurring within the plots. Three-foot belt transects were established, and the browse species occurring in this transect were mapped and measured. Outside of this fenced enclosure a plot with similar forage composition was staked out 100 feet square and similar line and belt transects were established in that. By this method it was hoped to find out the amount of increase under complete protection as compared to the increase or decrease under rather severe use outside the plot. These measurements were taken in the spring at the end of each of the current year's grazing. The end of the grazing season is considered to be in the spring just before new growth starts. At the end of the growing season in the fall and at the end of the grazing season 25 tufts of the principal grass species are clipped at ground level from inside and out of the enclosures. Also 200 twigs of the representative browse species are taken both inside and out. These samples are all air-dried, weighed, and compared. Theoretically, differences in weight of the clippings would be the amount that is eaten

by the grazing animals. Movable panel plots were also put at each of the set-ups which will be moved each year so a check on the present year's growth can be obtained.

Along with the experimental plots a series of hardware cloth barriers were spaced on slopes approximately 10 feet apart to determine the relative amount of soil movement on slight slopes. After the first year the amount of build-up behind these barriers was surprising not only to the range men but also to the various representatives of the Government agencies. This seems to indicate that even on range types with very heavy brush cover that brush alone will not prevent soil movement, and there must be grass there to hold the soil in place.

This is the basis of the experiment as it is now being carried on, and it is hoped with this small start that something a little more practical can be worked out between the cooperative agencies and the range users.

In addition to the four objectives outlined by the mohair growers the following data may be obtained:

1. Forage acre requirements for goats on a given type of range.
2. The proper use factor for goats for the principal forage species.
3. Kind and amount of accelerated erosion occurring on so-called typical goat ranges in Arizona.
4. Changes in vegetational density and composition and forage production under no grazing and under the various degrees of use to be practiced.

Under the plan now working with the range-goat producers rainfall records are kept and actual stocking records on all of the areas within the two ranches are maintained so at the end of each season the number of animal units grazed for any given length of time can be determined.

The estimated carrying capacities first established are very much lower than the actual stocking on the ranges. There is an economic side of the question to be considered as well as strictly proper grazing and range control practices.

In order to pay for herders and the expense of handling, it is necessary that goats from these Arizona ranges be handled in bands varying from 1,500 to 2,000 head except during kidding time. If these herds of goats were cut down to the number determined by our original survey it would be impractical from the economic

standpoint for a goat man to stay in the business. He would have to lease, own, or control in some form or another much more land than he could afford to pay from the revenue that came from the goats grazed upon it.

The question that now confronts us from a range management standpoint is, how can one get the utmost use from the browse species without severely over-using the small amount of grass in the total forage composition? Although goats are principally browse eaters they will, both by trampling and grazing, overuse grass when its relative composition is 10 or 15 percent of the total. It appears that, on these particular ranges under study, if they were stocked either with cattle or with goats to such a degree as to make increased grass production favorable the browse species would hardly be touched. Here again this would stimulate growth from the brush and it would also tend to choke out and shade out what grass is now available.

Within the next year or two it is planned to have control of an area from three to six sections in size that can be divided into three parts, one of them stocked at the accepted stocking rate of the range users, one at the rate determined by an inter-agency range survey, and one at a rate still lower. If this can be done perhaps some definite conclusions will be determined as to the proper stocking rates, proper use factor and forage acre requirement for the Angora goats. These questions are far from being answered now, but to have the range men interested in such a program is a great step in a forward direction.

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PIONEERS

When friendly Indians taught the early settlers in America that corn would increase its tempo of growth if three moribund alewives were placed in each corn hill, farm demonstration work made its initial bow. --C. W. Warburton

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WORTHY GOALS

"The reward must go to the man who does his work well; for any other course is to create a new kind of privilege, the privilege of folly and weakness, and special privilege is injustice whatever form it takes.... Let us try to level up, but let us beware of the evil of leveling down." --Theodore Roosevelt

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Every production of genius must be the production of enthusiasm.
--Disraeli

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LEARNING TO EARN

By J. W. Potts, Asst. State (Texas) Boys Club Agent

(This story of the marketing experience Hale County, Texas, boys are getting represents one of the most practical developments in the 4-H field, which has counterparts in other States. Iowa, Minnesota, and South Dakota are pioneering in lamb feeding and marketing on a group basis, and Maryland has undertaken a like project. Chicago's junior market lamb show and sale June 18-19 provided for classes of five and ten lambs by an exhibitor, and similar events are sheduled at Peoria and Springfield, Ill., and Evansville and Indianapolis, Ind. Nevada has a 4-H cooperative project in breeding purebred Hereford cattle. There are other commercial size enterprises under way in various lines of farm production.)

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The Hale County 4-H Club boys are back from another annual trip to market. This year their finished livestock was shipped to Kansas City to be sold, but before the livestock is marketed let's find out just what these Hale County 4-H boys are doing in their feeding demonstrations.

There were 125 in the county last year who carried on feeding demonstrations. There were 215 boys enrolled in Hale County, and as can be seen, slightly more than 50 percent are engaged in livestock feeding work. The feeding program in this county is well organized and conducted on a strictly commercial and practical basis. The boys who are feeding swine generally produce their own pigs for feeding, however, the lambs and calves are bought from breeders who produce high-quality stock.

The boys are encouraged by their county agents to feed not less than five head of livestock, but this is not a set rule. The boy must have sufficient feed for his feeding demonstrations before the animals are selected for him. Home-grown feeds are used in all the demonstrations so far as possible, and in some cases cottonseed hulls were substituted for cottonseed meal with good results.

After the county show at Plainview the calves and lambs were shipped to Kansas City and sold. There were 142 calves and 253 lambs in the shipment. The hogs were sold in Plainview. Hale County 4-H boys fed 116 head of these calves, and a total of 365 lambs. Part of the lambs were sold at home and at other livestock shows where they had been exhibited. Eight stock cars were required to move the shipment from Plainview to Kansas City.

All livestock was classified and sold on its merits. The top 32 calves sold for $11.50 per hundred, which was top on the market for two months. The average selling price of the calves was $10.40 per hundredweight and the lowest group sold for $8.50. The top milk-fed lambs sold for $11.50 per hundredweight which was also a top price. The fat fed lambs (unshorn) sold from $10.25 to $10.75 per hundredweight.

Total sales were as follows: 140 calves--$12,451.07; 253 lambs -- $2,203.36; and 140 hogs--$1,470.00 for a grand total of $16,124.43.

Thirty-seven boys, eight adult leaders, C. B. Martin, county agent, Harry Igo, assistant county agent, K. J. Edwards, district agent, and L. L. Johnson, State boys' club agent, made the trip to Kansas City. There the boys and leaders saw their livestock classified and sold. The marketing end of their program is an important part of their demonstration, and a trip to one of the major stock yards is very educational. Different groups make the trip to market esch year.

Programs of this type require a good organization with much local support. The Hale County program has both. Financing where needed is obtained from the local Production Credit Association or through local banks. Local 4-H leaders and parents are solidly behind the program, and businessmen and civic leaders have always looked with much favor and interest upon it.

This program is teaching 4-H boys of Hale County the practical feeding program for the average farmer of that area. Theirs is a group program and hence they are learning the value of cooperation, and above all they are selling their surplus feed stuff at home at a very good price. This type of feeding plan is being encouraged, and it is rapidly expanding to all sections of Texas.

Twenty counties this year have already had a group marketing day at Fort Worth. These counties carried on programs similar to that of Hale County. While in Fort Worth the 4-H boys and leaders were the guests of the Fort Worth stockyards company, the packers, and commission men. All such days have been very successful.

K. J. Edwards, district agent, says that from 100 to 200 head of calves will be fed this year in each of several surrounding counties. This is a result of the fine record that has been made in Hale County. All of these calves will be dry-lot fed on the same basis as the Hale County program. —(From National 4-H Club News, June 1940.

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AN APPRECIATION OF ANIMAL HUSBANDMEN

All that is art or skill, all that is science, and all that is educational in animal husbandry have identified and drawn into a robust fellowship a distinctive breed of men, who are conscious of belonging together. Theirs is an uncontrived, unlabeled union of the sovereign forces of heart, character, and mind.

Unorganized, pioneer breeders in the United States were, and their successors today are, leaders in their communities. American breeders support and participate in a wide range of scientific and business leadership. Upon these men and the professors of animal husbandry and their co-workers in the agricultural colleges and the U. S. Department of Agriculture rests the moral burden of functional leadership in the whole field of improved animal production. Such leaders are uniquely qualified to take part in building a sound agriculture, and thereby contribute to the general welfare of the nation.

Information that technically trained animal husbandmen have laboriously assembled, bit by bit, has worked its way into the warp and woof of established practices on all livestock and dairy farms in America. Animal husbandry science is on visible record in every class of every breed or grade at every show of farm livestock; it guides the hand of every herdsman, shepherd, and groom; every 4-H Club member who feeds a farm animal is its beneficiary; it has flowered in a useful and increasingly popular knowledge of animal genetics and nutritional chemistry, ministers effectively, in veterinary practice and advice, to countless herds, flocks, and studs, and is the factual foundation of animal husbandry instruction in every class room and judging pavilion.

By virtue of their more than pecuniary interest in good livestock, animal husbandmen foster a system of diversified farming. In practice, that system bears vitally and remedially on some of agriculture's basic difficulties. For it not only requires pastures and meadows which hold the topsoil of farm and ranch, but reduces the costs of producing meat, milk, and wool, promotes the health of herds and flocks, and enriches the lives of children reared where calves, lambs, pigs, and foals play and prank outdoors. --DeWitt C. Wing, U.S.D.A., in The Cattleman, June 1940.

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Genius begins great works; labor alone finishes them.
--Joubert

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Labor is the great producer of wealth; it moves all causes.
—Webster

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FROZEN-FOOD-LOCKER COUNT

Folks interested in the production and preservation of a home-raised food supply will be gratified in the growth of the frozen-food-locker industry as reported by extension workers in July 1940. Over 2,900 plants now (September) provide freezer storage for the foods needed to supplement diets of canned and cured products.

The following figures give a representative picture of locker development for the last three years -

Item	1940	1939	1938
Number of States reporting locker plants..	44	38	33
Total number of locker plants	2,870	1,861	1,269
Locker plants operating in connection with some other business	76%	77%	--
Cooperative locker plants	14%	10%	--

The July 1940 count of locker plants by States was:

Alabama 14	Maine 0	Ohio 50
Arizona 1	Maryland 5	Oklahoma 82
Arkansas 7	Massachusetts .. 3	Oregon 223
California ...38	Michigan 67	Pennsylvania . 29
Colorado 40	Minnesota 275	Rhode Island . 0
Connecticut .. 1	Mississippi ... 4	South Carolina 0
Delaware 2	Missouri 33	South Dakota . 85
Florida 1	Montana 55	Tennessee 20
Georgia 5	Nebraska 162	Texas 70
Idaho 100	Nevada 1	Utah 35
Illinois 164	New Hampshire . 1	Vermont 1
Indiana 50	New Jersey 1	Virginia 3
Iowa 450	New Mexico 2	Washington ...325
Kansas 125	New York 15	West Virginia. 1
Kentucky 0	North Carolina.. 4	Wisconsin 275
Louisiana 3	North Dakota ...25	Wyoming 17

The National Frozen Food Locker Association will hold its second annual meeting at the Stevens Hotel in Chicago, October 28-30, 1940. --K.F. Warner

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The world will never starve for want of wonders; but only for want of wonder. --G. K. Chesterton

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The reward of a thing well done, is to have done it.
--Emerson

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RECENT PUBLICATIONS

(This list is limited to publications of interest to extension workers. In most cases copies are available from the institution or agency issuing them. Do not write Washington for other than U.S.D.A. publications.)

Federal

"Factors Affecting Maintenance Nutrition, Feed Utilization, and Health of Farm Animals," by Louis L. Madsen, Bureau of Animal Industry, U.S.D.A., Washington, D.C., - Yearbook Separate No. 1693, pp. 19.

"Growth, Fattening, and Meat Production," by O. G. Hankins and Harry W. Titus, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1694, pp. 19.

"Some Effects of Nutritional Levels," by Paul E. Howe, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1695, pp. 7, illus.

"The Relation of Diet to Reproduction," by Ralph W. Phillips, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1696, pp. 16.

"The Relation of Production of Hides and Wool," by John I. Hardy and Imogene P. Earle, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1697, pp. 9, illus.

"The Nutrition of Very Young Animals," by Imogene P. Earle, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1698, pp. 18.

"Nutritional Requirements of Beef and Dual-Purpose Cattle," by W. H. Black, et al., Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1699, pp. 25.

"Practices in Feeding of Beef and Dual-Purpose Cattle," by W. H. Black, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1700, pp. 22, illus.

"Nutritive Requirements of Swine," b N. R. Ellis and J.H. Zeller, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1709, pp. 17, illus.

"Practices in Swine Feeding," by J. H. Zeller and N.R. Ellis, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1710, pp. 23, illus.

"Feeding Problems With Sheep," by Damon A. Spencer, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1711, pp. 12, illus.

"Feeding Problems With Goats," by Damon A. Spencer, Bureau of Animal Industry, U.S.D.A., Washington, D. C. - Yearbook, Separate No. 1712, pp. 5, illus.

"Nutrition of Horses and Mules," by Earl B. Krantz and S.R. Speelman, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1713, pp. 24.

"Pasture and Range in Livestock Feeding," by P.V. Cardon, et al., Bureau of Plant Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1719, pp. 31, illus.

"The Nutritive Value of Harvested Forages," by T.E. Woodward, et al, Bureau of Dairy Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1720, pp. 36, illus.

"Losses in Making Hay and Silage," by J. A. LeClerc, Bureau of Agricultural Chemistry and Engineering, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1721, pp. 25.

"Deficient and Excess Minerals in Forage in the United States," by A. M. Hartman, Bureau of Dairy Industry, U.S.D.A., Washington, D.C. - Yearbook Separate No. 1723, pp. 18.

(Note: The above are reprints from the U.S.D.A. Yearbook of Agriculture, 1939.)

"Estimating Weights of Lambs at a Constant Age," by Ralph W. Phillips and G.W. Brier, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - Circular No. 541, Feb. 1940, pp. 16, tables and graphs.

"A Study of Some Problems Involved in Measuring Performance in the Horse," by Ralph W. Phillips, et al, Bureau of Animal Industry, U.S.D.A., Washington, D.C. - (Multigraph) pp. 34, tables 9, figs. 5.

"Land Use Planning Under Way," - Bureau of Agricultural Economics, U.S.D.A., Washington, D.C. - July 1940, pp. 48, figs. 10.

"Farm Production and Income from Meat Animals, by States, 1938-1939," - Agricultural Marketing Service, U.S.D.A., Washington, D.C. - (Mimeograph) pp. 24, May 1940.

"Probable Effects of the Agricultural Conservation Program on Livestock Production in the Midwest Dairy Region - Part II - Northeastern Iowa - A Corn Belt Transition Area," by Sherman E. Johnson, et al, Bureau of Agricultural Economics, U.S.D.A., Washington, D.C. - (Mimeograph) pp. 53, Jan. 1940.

"Statistical Results of Cooperative Extension Work, 1939," by M. C.Wilson and H. W. Porter, Extension Service, U.S.D.A., Washington, D.C. - Ext. Serv. Circular 334, May 1940, mimeo. pp. 18.

"The 4-H Clubs Forge Ahead" (Report of National 4-H Club Work, 1938), by Ray A. Turner, Extension Service, U.S.D.A., Washington, D.C. - Ext. Serv. Circular 330, May 1940, mimeo. pp. 14.

"Cultural Approach in Extension Work," by M. L. Wilson, Extension Service, U.S.D.A., Washington, D.C. - Ext. Serv. Circular 332, May 1940, mimeo. pp. 12.

"A Graphic Summary of Grazing of the Public Lands of the Intermountain Region. Part I. Regional Aspects of Range Resources and Trends in Range Use," by Arthur H. Roth, Jr., Forest Service, U.S.D.A., Washington, D.C. - (Mimeograph) Jan. 1940, pp. 54, figs. 48.

State

"Rations for Fattening Cattle in Arizona," by E.B. Stanley and A.H. Walker - Arizona Experiment Station Bulletin 170, March 1940, pp. 19, tables 17.

"Beef Production in California," by H. R. Guilbert and Louis H. Rochford - California Extension Service Circular 115, Apr. 1940, pp. 125, figs. 25.

"Swine Husbandry in Idaho," by J.E. Nordby, et al - Idaho Extension Service Bulletin No. 117, August 1939, pp. 64, figs. 31.

"Selecting and Fattening 4-H Beef Calves," by E. F.Rinehart - Idaho Extension Service Bulletin No. 128, Dec. 1939, pp. 42, figs. 20.

"Indiana Stallion Enrollment" (1939 Annual Report) - Indiana Experiment Station Circular No. 253, Dec. 1939, pp. 44.

"An Economic Study of the Baby Beef Enterprise in Southern Iowa," by J. A. Hopkins, et al - Iowa Experiment Station Research Bulletin 272, Apr. 1940, pp. 46, tables 23.

"Pasture - Improvement and Management," by H. B. Cheney - Iowa Experiment Station Bulletin P8, Mar. 1940, pp. 27, figs. 13.

"Legumes, Grasses, and Cereal Crops for Silage," by A. C. Ragsdale and H. A. Herman - Missouri Experiment Station Circular 209, June 1940, pp. 10, illus.

"Winter Care of Ewes," by Albert J. Dyer - Missouri Experiment Station Circular 415, Mar. 1940, pp. 10, figs. 4.

"The Missouri Plan of Growing Thrifty Pigs," by J. W. Burch- Missouri Extension Service Circular 416, Mar. 1940, pp. 12, figs. 5.

"The Missouri Plan of Sheep Improvement," by T. A. Ewing and J. W. Burch - Missouri Extension Service Circular 417, Mar. 1940, pp. 16, Figs. 4.

"Livestock Handbook" (for county agents), by T. A. Ewing- Missouri Extension Service, June 1940, multigraphed bulletin, pp. 47.

"Pasture Management," by Ralph W. Donaldson - Massachusetts Extension Service Leaflet No. 150, Mar. 1940, pp. 12, illus.

"Freezing and Storage of Foods in Freezing Cabinets and Locker Plants," by D. K. Tressler and C. W. DuBois - New York Experiment Station (Geneva) Bulletin No. 690, May 1940, pp. 60, figs. 20.

"Raising Hogs in North Carolina," by H. W. Taylor and J. E. Foster - North Carolina Extension Service Circular No. 238, June 1940, pp. 25, illus.

"Your 4-H Steer - How to Find, Feed, and Finish Him," by L. P. McCann - Ohio Extension Service 4-H Circular 124, Jan. 1940, pp. 4.

"The Conservation of Alfalfa, Timothy and Soybean Nutrients as Silages and as Hays," by J. A. Newlander, et al - Vermont Experiment Station Bulletin 459, June 1940, pp. 42, tables 8.

"Save Plant Food in Manure," by A. R. Whitson, et al - Wisconsin Extension Service Circular 296, Feb. 1940, pp. 16,illus.

"Grass Silage," by G. Bohstedt, et al - Wisconsin Extension Service Circular 299, May 1940, pp.20, figs. 7.

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FROZEN-FOOD LOCKER FILM STRIP

"Frozen-Food Lockers and Your Food Supply" is the title of a new film strip just completed by the U.S.D.A. Extension Service. In 63 frames it illustrates the advantages and disadvantages of the various types of freezer storage, and their use by a farm family. Purchased through the Extension Service the cost, including the lecture notes, will be 55 cents.

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